

entity) for such extension. In view of the remarks set forth below, the Applicants respectfully request reconsideration of the Examiner's rejection of the pending claims.

REMARKS

Claims 1 through 17 are pending and were rejected by the Examiner under 35 U.S.C. 103(a), as being obvious over U.S. Patent 5,953,467 ("Madsen") in view of U.S. Patent 5,689,597 ("Besse"). Applicants respectfully request reconsideration of the Examiner's rejection of claims 1 through 17.

Of the pending claims, claims 1 and 13 are written in independent form. The remaining claims 2-12 and 14-17 depend from, and thus include all of the limitations of, claims 1 and 13, respectively.

Claim 1 requires, among its limitations, a multimode interference coupler having a "multimode region coupling the . . . input waveguides to the . . . output waveguides . . . the multimode region [having] two opposing sidewalls . . . at least one of the sidewalls [having] *a nonlinear taper inward towards the opposing sidewall . . .*" (emphasis added). Claims 2-12 also recite this limitation by virtue of their dependence on claim 1.

Similarly, claim 13 requires, among other limitations, a "multimode region [having] two opposing sidewalls which define a width of the power splitter at each point along the propagation axis with the width of the first end and second end being substantially equal; *and . . . sidewalls symmetrically tapered inward toward each other* around a center line of the propagation axis *wherein the taper is a continuous curve . . . along the propagation axis . . .*" (emphasis added). Claims 14-17 also recite this limitation by virtue of their dependence on claim 13.

No such arrangements are disclosed in or suggested by Madsen, either alone or in combination with Besse. In discussing claims 1 and 13, the Examiner asserted that item coupler 14 of Figure 1 of Madsen discloses the sidewalls of a multimode region. See Office Action at pages 2 and 5. The Applicants respectfully disagree. Figures 1 through 6 of Madsen, and their accompanying description in the specification, disclose what Madsen describes as its preferred embodiment, in which the couplers 14 are *directional couplers*. See e.g., Madsen, col. 2, lines 65-66 ("In a preferred embodiment, the splitting device comprises a directional coupler . . ."). Madsen makes a clear distinction between directional couplers 14 and multimode interference ("MMI") couplers, noting that an MMI coupler can be used in an alternative embodiment in place of directional couplers 14. See Madsen, col 5, lines 11-17 (noting, after describing Figures 1 through 6, that "[t]he 2-input by 2-output architectures described so far can be generalized to create NxN devices. For the NxN case, the directional couplers can be replaced by either a star coupler or a Multi-Mode Interference (MMI) coupler. FIG. 7 is an alternative embodiment of a switchable filter using a 4x4 MMI coupler 70.")

The MMI coupler 70 is shown in Figure 7 of Madsen and described in columns 5 and 6. These portions of Madsen are the only ones in which relate to multimode regions at all. However, nowhere in these portions, nor anywhere else in the Madsen reference, is it disclosed or suggested that one or more sidewalls of MMI coupler 70 should have a nonlinear inward taper, or that both sidewalls should curve inwardly, as is required by claims 1-17.

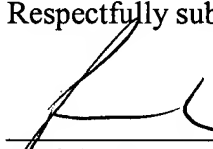
Besse fails to make up for this deficiency, and indeed was not cited by the Examiner for the purpose of doing so. Rather, Besse was cited as allegedly disclosing limitations other than the nonlinear inward taper or inward curve recited by claims 1 through 17. Accordingly,

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Applicants respectfully submit that the combination of Madsen and Besse remains deficient, and fails to establish a *prima facie* case of obviousness with respect to claims 1 through 17.

In view of the foregoing, the Applicants respectfully request that the rejection of claims 1 through 17 under Section 103(a) be withdrawn. Furthermore, the Applicants respectfully submit that the presently pending claims are in condition for immediate allowance. In the event that the present application is not deemed to be in condition for allowance, the Examiner is invited to contact the undersigned in an effort to advance the prosecution of this application.

Respectfully submitted,



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